SCS ENGINEERS

Soil Boring Work Plan

Limited Phase II Investigation

Former Pioneer Paint and Associated Properties Brownfields Restoration Project Tucson, Arizona

Presented to:

CITY OF TUCSON
100 North Stone Ave
PO Box 27210
Tucson, Arizona 85726-7210

Presented by:

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July 6, 2007
File No. 10.204058.06

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July 6, 2007
SCS File No. 10.204058.06

Ms. Lynne Birkinbine
Environmental Services
City of Tucson
P.O. Box 27210
Tucson, Arizona 85726-7210

Subject: Soil Boring Work Plan
Limited Phase II Investigation
Former Pioneer Paint and Associated Properties
Brownfields Restoration Project
Tucson, Arizona

Dear Lynne:

SCS Engineers (SCS) is pleased to provide this Work Plan for proposal soil boring investigation activities at the above-referenced site. If you have any questions regarding this document, please feel free to contact either of the undersigned.

Sincerely,

Patricia M. Hartshorne, RG
Senior Project Geologist

Bradley F. Johnston, RG
Vice President
SCS ENGINEERS

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BACKGROUND

SCS Engineers (SCS) has been requested by the City of Tucson, Environmental Services (City) to perform an investigation of the former Pioneer Paint property and other associated parcels in downtown Tucson. Figure 1 shows the proposed study area. For discussion purposes, the study area has been divided into two areas. Area A consists of the former Pioneer Paint parcels, and Area B consists of the remaining portion of the area of interest. SCS understands that the northern portion of the area of interest may be redeveloped as a parking lot or structure, and the southern portion may include an arena structure.

PROJECT UNDERSTANDING

SCS is currently performing a Phase I Environmental Site Assessment (ESA) of the study area. Based on the historical information reviewed, the northeast portion of the site was previously occupied by a general contractor in the 1930s and Pioneer Paint and Varnish Company from the mid-1930s to the mid-1990s. The facility mixed raw materials and distributed paint products; they also distributed a limited amount of raw materials, primarily thinners. Impacts to soil and possibly perched groundwater at the site have been identified in association with the storage and use of chemicals at this facility and releases from four former underground storage tanks (USTs) that contained solvents. The northwest portion of the site was previously occupied by residences, a furniture warehouse, a restaurant, and a gasoline station that was present from the 1960s through the 1980s; soil and possibly perched groundwater were impacted by releases from UST systems at the gasoline station. The central portion of the site was generally occupied by vacant land, was leased by a lumber company, and was occupied by a concrete products company. The southern portion of the site was previously occupied by residences. The entire site may have been occupied by cultivated agricultural fields prior to the mid-1910s. The eastern side of the site was occupied by a railroad by at least 1919. Specific areas of concern are identified on Figure 1.

Nature of Soil Contamination at Former Pioneer Paint Location

USTs formerly located in the area of concern reportedly contained toluene, xylenes, isopropyl alcohol, naphtha, and mineral spirits. Soil investigations performed by Woodward Clyde and Western Technologies, Inc. (WTI) in 1989 evaluated the presence of benzene, toluene, ethylbenzene, and xylenes in the subsurface. The WTI investigation included drilling and sampling of six soil borings within the former UST excavation, and nine borings around the former USTs. This investigation determined that benzene was not present above laboratory detection limits in any of the 15 borings drilled, but petroleum hydrocarbons, toluene, ethylbenzene, and xylenes were detected.

Degree and Extent of Soil Contamination at Former Pioneer Paint Location

Petroleum hydrocarbons exceeded the 1997 non-residential soil remediation level (NRSRL) at a depth of 15 feet in only one soil boring, drilled in the southeast corner of the tank excavation area. The groundwater protection level (GPL) for ethylbenzene was exceeded in five of the borings drilled within the tank excavation, between the depths of 12 and 30 feet. Therefore, it is assumed that the maximum depth of contamination requiring remediation is between 30 and 35

feet deep. The area of contamination exceeding these guidelines appears to measure approximately 20 feet by 30 feet (assuming the scale in the WTI report is correct), although the lateral extent may not be adequately defined by the existing WTI boring data because sample depths were different in the tank excavation borings and the lateral extent borings.

It should be noted that new SRLs became effective on May 5, 2007. Any soil sampling performed after that date will be compared to these new standards or GPLs, whichever is lower. It is assumed that non-residential SRLs or GPLs will be used for this project.

Nature of Soil Contamination at Former Texaco Service Station Location

Fuel USTs were formerly located in two separate areas on the western portion of the former Texaco property, one used oil UST was located on the eastern portion of this property, and dispenser islands were previously located in three locations in the eastern portion of the property. Only the used oil UST and part of the southern dispenser island appear to have been located on the subject site. Detectable hydrocarbons and BTEX were found in soil beneath the fuel USTs, piping, and the north and south dispenser islands during removal of the UST systems by Dames & Moore (D&M) in 1996. Eighteen soil borings were drilled by D&M in 1995, 1996, and 1997 at the property to evaluate the former UST area and the extent of contamination at four release areas defined by ADEQ at the north dispenser island, the south dispenser island, beneath one gasoline UST, and beneath the east excavation/piping area. Contamination was detected at the UST excavation, area, the north dispenser island area, and at several locations only at 30 feet below ground surface (bgs). ADEQ closed the case file for this UST release; however, this was based in part on an estimated depth to water of 90 feet bgs, which is probably not correct based on the presence of perched groundwater between 30 to 35 feet at the Pioneer Paints property.

Degree and Extent of Soil Contamination at Former Texaco Service Station Location

Two locations sampled at the north dispenser island and the west wall of the UST excavation during removal of the UST systems exceeded the current soil cleanup standards for benzene, ethylbenzene, and/or xylenes. One soil boring location at the north dispenser island had a sample that exceeded the current residential soil cleanup level for xylenes at 10 feet bgs. Contamination at the property appeared to extend off the property to the north and east, and may extend onto the northwest portion of the subject site. Contamination detected at the approximate level of the perched aquifer zone at 30 feet may or may not be associated with the Texaco property.

Remainder of Site

Other areas of contamination were not identified on the remainder of the site. However, concrete products manufacturing and lumber yard occupants on the southern portion of the site could be potential sources of contamination, depending on the activities that were performed at these facilities. The eastern portion of the proposed study area includes a sanitary sewer main, and the two drainage features cross the central and southern portions of the site that carry water from east of the site westward to the Santa Cruz River.

PURPOSE

The objectives of this Limited Phase II Investigation are as follows:

- Establish whether excavated soil from the Pioneer Paint UST release area would be considered hazardous waste
- Evaluate previously-assessed soil contamination and areas of concern to establish current concentrations and extent of contaminants of concern using current field and laboratory methodologies
- Evaluate additional potential areas of concern for the potential presence of contaminants of concern

WASTE CHARACTERIZATION

SCS has reviewed available documentation describing the types of materials stored in the Pioneer Paints property USTs in an attempt to determine whether they were waste or virgin products, whether they were mixtures or single active ingredients, the time during which they were stored, and other factors. This research was generally inconclusive as to whether the release is associated with a listed hazardous waste. However, the presence of petroleum hydrocarbons and the reported storage of Stoddard solvents in the tank system appears to indicate that Stoddard solvent may be the main source of the release.

Based on this information, SCS will prepare a waste characterization summary document for submittal to the ADEQ in an attempt to obtain a determination as to whether soil excavated from the release area would be considered hazardous waste. SCS will also collect up to three soil samples from the borings described below for toxicity analysis by TCLP for contaminants of concern. The results of these analyses will be used if necessary to determine whether the soil is a characteristic hazardous waste.

SOIL BORINGS

Rationale

Existing soil characterization data is over 15 years old, so additional characterization of soil contamination will be performed because contaminants may have degraded over time, and sample collection and analysis methods have changed. In addition, the lateral extent may not be adequately defined by the existing WTI boring data because sample depths were different in the tank excavation borings and the lateral extent borings. Finally, the City has requested a soil investigation of parcels located west, east, and south of the Pioneer Paint parcel.

The location and purpose for each boring location shown on Figure 2 is summarized below

1 and 2: Located within the former Pioneer Paints facility UST area. Evaluate degree and vertical extent of previously-identified soil contamination from the UST area.

3: Located east of the former Pioneer Paints facility UST area. Evaluate the eastern lateral extent of previously-identified soil contamination from the UST area. If the boring can be located at least 20 feet east of the existing well WR-252A without threatening the nearby sewer line within the Greenway, the boring will be completed as a perched zone monitoring well to evaluate the eastern extent of groundwater contamination.

4: Located south of the former Pioneer Paints facility UST area. Evaluate the southern lateral extent of previously-identified soil contamination from the UST area.

5: Located west of the former Pioneer Paints facility UST area, and at the former location of a hazardous waste storage trough identified on historical building plans. Evaluate the western lateral extent of previously-identified soil contamination from the UST area, and the potential presence of contamination from the hazardous waste storage trough.

6: Located north of the former Pioneer Paints facility UST area, and within the former drum/solvent room or varnish cooking and mixing area, which included at least one solvent dispenser and where manufacturing occurred. Evaluate the northern lateral extent of previously-identified soil contamination from the UST area, and the potential presence of contamination from manufacturing operations.

7: Located within the former pigment storage area of the Pioneer Paints facility identified by historical building plans. Evaluate the potential presence of contamination from manufacturing operations.

8: Located within the former Pioneer Paints factory area. Evaluate the potential presence of contamination from manufacturing operations.

9: Located within the former Pioneer Paints dissolver room. Evaluate the potential presence of contamination from manufacturing operations.

10: Located within the former Pioneer Paints drum storage room. Evaluate the potential presence of contamination from manufacturing operations.

11: Located in the former aboveground storage tank (AST) area of the Pioneer Paints facility. Evaluate the potential presence of contamination from the tanks. This area was previously investigated by six shallow soil borings advanced to less than 20 inches bgs.

12 and 13: Located in the former AST area of the Pioneer Paints facility identified by aerial photographs. Evaluate the potential presence of contamination from the tanks.

14: Located south of the former warehouse at the location of a sump west of the loading dock at the Pioneer Paints facility. Evaluate the potential presence of contamination from the sump.

15: Located within a former surface impoundment area at the Pioneer Paints facility. Evaluate the potential presence of contamination associated with the impoundment. This area was previously investigated by two shallow soil borings advanced to 2 and 6 feet bgs.

16 and 17: Located at the former gasoline service station. Evaluate the potential presence of fuel contamination.

18, 19, and 20: Located in the greenway in the former railroad easement, east of potential contamination on the former Pioneer Paint property. Evaluate the lateral extent of contamination, if present. Boring 18 is also located near the former location of ASTs.

21: Located at former small structures apparently associated with a lumber storage yard. Evaluate the potential presence of contamination associated with these activities.

22: Located as close as possible to a former building identified as a concrete mixing facility. Evaluate the potential presence of contamination associated with these activities.

Methodology

It is anticipated that these borings will be drilled with a hollow-stem auger. This drilling method is intended to minimize subsurface vibrations that could affect the sewer main along the eastern boundary of the study area. It also minimizes the introduction of air into the subsurface during drilling, thereby minimizing volatilization of volatile organic compounds (VOCs) and providing more representative soil samples.

Because they are located in and around known soil contamination, Borings 1 through 6 will be drilled to a depth 60 feet bgs, or until the perched aquifer is encountered, whichever is shallower. The remaining soil borings will be drilled to a minimum depth of 30 feet. If no contamination is detected, the boring will be terminated at 30 feet. If contamination is encountered, the boring will be drilled to 60 feet bgs, or until the perched aquifer is encountered, whichever is shallower.

Soil samples will be collected at 5-foot intervals beginning at 10 feet. Soil samples will be selected for laboratory analysis based on field observations. For borings that do not exhibit field indications of contamination, the bottom sample (30 or 40 feet bgs), the top sample (10 feet bgs), and a middle sample (approximately 25 feet bgs) will be selected for analysis by an on-site mobile laboratory and a fixed laboratory facility as described below. For borings that exhibit field indications of contamination, all samples will be analyzed by the mobile laboratory, and three samples (the bottom sample and two samples with the highest mobile lab results) will be selected for analysis by the fixed laboratory.

In order to obtain real-time data to guide the investigation in the field, a mobile laboratory will be used to analyze samples for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8021, and total petroleum hydrocarbons by EPA Method 8015AZR1. Although there is currently no SRL for total petroleum hydrocarbons, the total petroleum hydrocarbon results will be used for comparison to previous sample results and to determine, if possible, the type of petroleum involved in any identified releases. Samples will also be analyzed by a fixed laboratory for VOCs by EPA Method 8260B, polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8310, and total arsenic, cadmium, chromium, lead, mercury, nickel, and silver by EPA Method 6010/7471. Fixed laboratory analyses will be run on a rush 5-day turnaround basis.

Up to three soil samples will also be selected for in-situ waste characterization. These three samples will be selected to represent the moderate to high range of observed contaminant

concentrations. Samples will be analyzed by the fixed laboratory using the TCLP method for VOCs and RCRA metals.

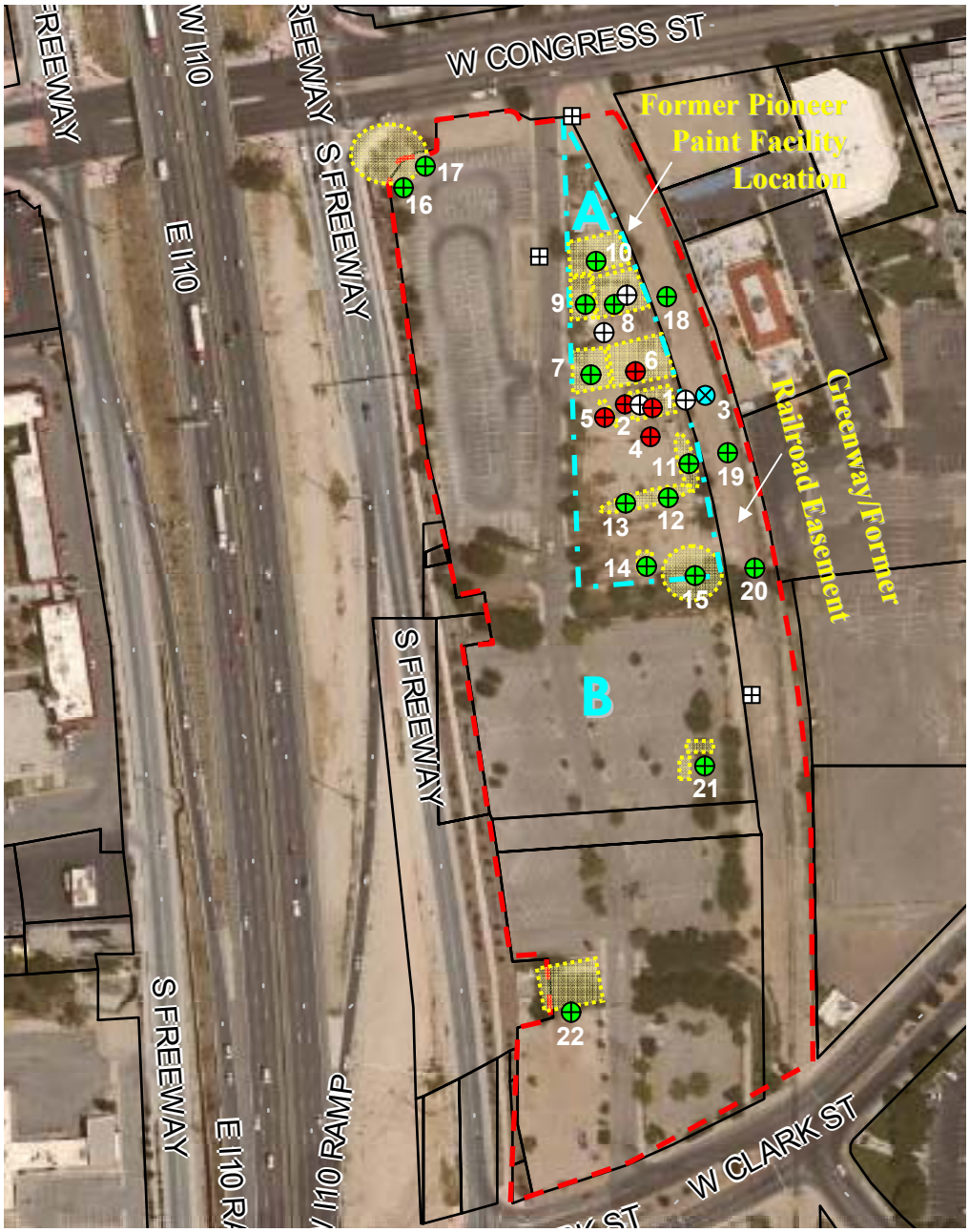
Depending on observations during drilling, groundwater grab samples may be collected from perched water in up to three of the soil borings. The sampling locations will be based on field monitoring of VOCs using a photoionization detector. The samples will be collected from the open drill stem using a bailer, and will be analyzed for VOCs by EPA Method 8260B.

Soil borings will be abandoned by backfilling to the surface with cement/bentonite grout. Drill cuttings will be containerized in drums or rolloff bins, and characterized for disposal using the soil boring sample results. It will be assumed that drill cuttings will be disposed of by City of Tucson.

If Boring 3 can be located at least 20 feet east of existing well WR-252A without threatening the nearby sewer line, the soil boring will be converted to a perched zone groundwater monitoring well. The depth and configuration of the well will be dependent on observations during drilling, but it is assumed that the well will not exceed 80 feet in total depth, and will be constructed of 4-inch diameter Schedule 40 PVC with approximately 20 feet of screened interval. The well will be completed with a flush-mounted traffic-rated vault. It is assumed that the City of Tucson will perform sampling of this well.

REPORTING

The findings of the Limited Phase II Investigation will be summarized in a written report. The report will contain a description of field activities, scaled site maps, photographs, and laboratory reports.



EXPLANATION

- Proposed soil boring to evaluate previously-identified soil contamination
- Proposed soil boring, location based on Phase I research
- Proposed soil boring and perched zone groundwater monitoring well
- Existing regional groundwater monitoring well
- Existing perched zone groundwater monitoring well
- Area of concern identified by Phase I ESA
- A Pioneer Paints property
- B Other site properties
- Approximate boundary of site
- Approximate boundary of Pioneer Paints property

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APPROXIMATE SCALE IN FEET

SCS ENGINEERS

"Superior Customer Service"

Proposed Soil Boring Locations
Soil Boring Work Plan
Limited Phase II Investigation
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Tucson, Arizona

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Figure 1